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10 30  
atgaaaaagctgataaccgcacacatcacagcgattgtctctgtg  
M K K L I T A D D I T A I V S V  
  
50 70 90  
accgatcctcaatacgcggcagacggtacccgtgccgcatatgtaaaaa  
T D P Q Y A P D G T R A A Y V K  
  
110 130  
tcacaaggtaaatcaagagaaaagattcggtatacatcaaatatatggatc  
S Q V N Q E K .D S Y T S N I W I  
  
150 170 190  
tatgaaacgaaaacgggaggatctgttccttggacacatggagaaaaag  
Y E T K T G G S V P W T H G E K  
  
210 230  
cgaaggcaccgaccgaagatggtctccggacgggcgcacgcttgcctt  
R S T D P R W S P D G R T L A F  
  
250 270 2  
atttctgatcgagaaggcgatgcggcacagctttatcatgagcact  
I S D R E G D A A Q L Y I M S T  
  
90 310 330  
gaaggcggagaagcaagaaaaactgactgatatcccataatggcgtgtca  
E G G E A R K L T D I P Y G V S  
  
350 370  
aagccgctatggtccccggacggtaatcgattctggtaactatcagt  
K P L W S P D G E S I L V T I S  
  
390 410 430  
ttgggagagggggaaagcattgatgaccgagaaaaaacagagcaggac  
L G E G E S I D D R E K T E Q ,D  
  
450 470  
agctatgaacctgttgaagtcaaggcctctcctacaaacgggacggc  
S Y E P V E V Q G L S Y K R D G  
  
490 510 5  
aaaggcgtacgagaggtgcgtatgcccagcttgctgtcagcgt  
K G L T R G A Y A Q L V L V S V  
  
30 550 570  
aagtccgggtgagatgaaagagctgacaagtacaaaagctgatcatggt  
K S G E M K E L T S H K A D H G

**FIG.\_1A-1**

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590 610  
gatcctgcttttcctgacggcaaattggcttgcagctaat  
D P A F S P D G K W L V F S A N

630 650 670  
ttaactgaaacagatgatgccagcaagccgcatgatgtttacataatg  
L T E T D D A S K P H D V Y I M

**FIG.\_ 1A-2**

690 710  
tcactggagtctggagatcttaaggcaggttacacccatcgccgctca  
S L E S G D L K Q V T P H R G S

730 750 7  
ttcggatcaagctcatttcaccagacggaaaggatcttgcttgctt  
F G S S S F S P D G R Y L A L L

70 790 810  
ggaaatgaaaaggaatataagaatgctacgctctcaaaggcgtggctc  
G N E K E Y K N A T L S K A W L

830 850  
tatgatatcgaacaaggccgcctcacatgtcttactgagatgctggac  
Y D I E Q G R L T C L T E M L D

870 890 910  
gttcatttagcgatgcgtgattggagattcattgatcggtggct  
V H L A D A L I G D S L I G G A

930 950  
gaacagcgcccgattggacaaaggacagccaaagggtttatgtcatc  
E Q R P I W T K D S Q G F Y V I

970 990 10  
ggcacagatcaaggcagtacggcatctattatattcgattgaaggc  
G T D Q G S T G I Y Y I S I E G

10 1030 1050  
cttgttatccgattcgctggaaaaagagtacatcaatagctttct  
L V Y P I R L E K E Y I N S F S

1070 1090  
cttcacctgatgaacagcacttattgccagtgtgacaaagccggac  
L S P D E Q H F I A S V T K P D

**FIG.\_ 1B-1**

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1110 1130 1150  
agaccgagttagctttacagtatcccgcttggacaggaagagaaacag  
R P S E L Y S I P L G Q E E K Q

1170 1190  
ctgactggcgcaatgacaagttgtcaggagcatacgatata  
L T G A N D K F V R E H T I S I

1210 1230 12  
cctgaagagattcaatatgctacagaagacggcgtatggtaacggc  
P E E I Q Y A T E D G V M V N G

50 1270 1290  
tggctgtatgaggcctgcacaaatggaagggtgagacaacatatccactt  
W L M R P A Q M E G E T T Y P L

1310 1330  
attcttaacatacacggcggtccgcataatgatgtacggacatacatat  
I L N I H G G P H M M Y G H T Y

1350 1370 1390  
tttcatgagtttcaggtgctggcgccaaaggatacgcggtcgtttat  
F H E F Q V L A A K G Y A V V Y

## FIG.\_ 1B-2

1410 1430  
atcaatccgagaggaagccacggctacggcaggaatttgtaatgcg  
I N P R G S H G Y G Q E F V N A

1450 1470 14  
gtcagaggagattatggggaaaggattatgacgatgtatgcaggct  
V R G D Y G G K D Y D D V M Q A

90 1510 1530  
gtggatgaggctatcaaacgagatccgcatattgatctaagcggctc  
V D E A I K R D P H I D P K R L

1550 1570  
ggtgtcacggcggaagctacggaggtttatgaccaactggatcgctc  
G V T G G S Y G G F M T N W I V

1590 1610 1630  
ggcagacgaaccgcattaaagctgccgttacccagcgctcgatata  
G Q T N R F K A A V T Q R S I S

## FIG.\_ 1C-1

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1650 1670  
aattggatcagctttcacggcgtcagtgatatcggttattttttaca  
N W I S F H G V S D I G Y F F T

1690 1710 17  
gactggcagcttgaggcatgacatgtttgaggacacagaaaagctctgg  
D W Q L E H D M F E D T E K L W

30 1750 1770  
gaccgggtctccttaaaatacgcagcaaacgtggagacaccgctttg  
D R S P L K Y .A A N V E T P L L

1790 1810  
atactgcattggcgagcgggatgaccgatgccgatcgagcaggcggag  
I L H G E R D D R C P I E Q A E

1830 1850 1870  
cagctgtttatcgctctgaaaaaaaaatggcaaggaaaccaagcttgc  
Q L F I A L K K M G K E T K L V

1890 1910  
cgtttccgaatgcattgcacaatttatcacgcacccgacacccaaga  
R F P N A S H N L S R T G H P R

1930 1950 19  
cagcggatcaagcgctgaattatatcagctcatggttgatcaacat  
Q R I K R L N Y I S S W F D Q H

70  
ctc  
L

**FIG.\_1C-2**

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dap2_yeast	170	180	190	200	210	220
YUXL						
dap2_yeast	10	20	30	40	50	
YUXL						
dap2_yeast	230	240	250	260	270	280
YUXL	60	70	80	90		
dap2_yeast	290	300	310	320	330	
YUXL	100	110	120	130	140	
dap2_yeast	340	350	360	370	380	390
YUXL	160	170	180	190	200	210
dap2_yeast	400	410	420	430	440	
YUXL						
dap2_yeast	450	460	470	480	490	499
YUXL	280	290	300	310	320	330

**FIG.\_2A**

dap2_yeast	500	510	520	530	540	550
	TYKGPKVPYQKIVDFHSRKAEKCDGNVLGKSLYHILEKNEVLTKILEDYAVPR-KSEREL					
	::	:	::	::	::	::
YUXL	SIEGLVYPIRLEKEYINSFSLSLPDEQHFIASVTKPDRCSEL					
	340	350	360	370	380	
dap2_yeast	560	570	580	590	600	
	NLGKDEFGKD-----					
	:: :: :: :	:: :: :	:: :: :	:: :: :	:: :: :	
YUXL	TGANDKFVREHTISIPEEIQYATEDGVMVNGWLMPAQMEGETT--YPLILNTHGGPH-M					
	390	400	410	420	430	440
dap2_yeast	610	620	630	640	650	660
	QVVVKTFSVGENEVVASQLNAIVVVVDGRGTGFKGQDERSLVRDRRLGDYEARDQISAAS-L					
	:: :: : :: :: :: :: :: :: :: :: :: :: :	:: :: :: :: :: :: :: :: :: :: :: :	:: :: :: :: :: :: :	:: :: :: :: :	:: :: :	
YUXL	MYGHTYFHF-EQVLAAKGYA-VVYINPRGSHGYZGQEFTNAVRGDYDDVMQAVDEA					
	450	460	470	480	490	500
	↓ Ser					
dap2_yeast	670	680	690	700	710	720
	YGSLLTFVDPQKISLFGWSYGGYLTLKTLEKDGRHEKYGMWSAVPTDWRFYDSVYTERYM					
	:: :: :: : :: :: :: :: :: :: :: :: :: :	:: :: :: :: :: :: :: :: :: :: :: :	:: :: :: :: :: :: :	:: :: :: :: :	:: :: :	
YUXL	IKRDPHIDPKRLGVTTGGSYGGFMNTNWIVGQTN--RTKAAVTQRSTSISNWISFHGVSDIGXF					
	510	520	530	540	550	
	↓ Asp					
dap2_yeast	730	740	750	760	770	
	HTTP-QENFDGYVES-SVHNVTALAQANR---FLMMHGTGDDNVHFNQNSLKFFLDLLING					
	:: :: :: :: :: :: :: :: :: :: :: :: :	:: :: :: :: :: :: :: :: :: :: :: :	:: :: :: :: :: :: :	:: :: :	:: :	
YUXL	FTDWQLEHDMFEDTEKLWDRSPLKYAANVETPLLIHLGERDDRCPIEQAEQLFIALKKMG					
	560	570	580	590	600	610
	↓ His					
dap2_yeast	780	790	800	810		
	VENYDVHVFPDSDHSTRYHNANVIVFDKLLDWAKRAFDGQFVK					
	:: :: :: :: :: :	:: :: :: :: :: :	:: :: :: :: :: :	:: :: :	:: :	
YUXL	KETKLVR-FPNASHNLRSRTGHPRQRICKRLNYISSWFQHLL					
	620	630	640	650		

**FIG.\_2B**

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<b>yux1.bsupep</b> <b>YTMa</b>	<b>380</b> <b>QEEKQLTGANDKEVREHTISIPEEIQYATEDGVMVNGLMRPAQMEEGETTYPLILNIHGG</b> <b>10</b> <b>MIVEKRRFPSPSQHVRLYTICYLNSNGLRVKGLLAEPAE-PGQ--YDGFLYLRGG</b> <b>20</b> <b>50</b>	<b>410</b> <b>420</b> <b>430</b> <b>439</b>
<b>yux1.bsupep</b> <b>YTMa</b>	<b>440</b> <b>PHMMYGHTEFHEFQVLAAKGYAVYYINPRGSHG-YGQEFEVNNAVRGDDYGGKDYDDVMQAVD</b> <b>60</b> <b>IKSV-GMVRPGRIIQFASQGFVVFAFPFYRGNQQGEGNE-----DFAGEDREDAFSAF-</b> <b>70</b> <b>80</b> <b>90</b> <b>100</b>	<b>450</b> <b>460</b> <b>470</b> <b>480</b> <b>490</b>
<b>yux1.bsupep</b> <b>YTMa</b>	<b>500</b> <b>EAIKRDPHIIDPKRLGVTGGSYGGEMTNWIVGQTNRKAAVTQRSISNWI, SFHGVSSDIGYF</b> <b>110</b> <b>RLLQQHPNPKKDRIHIFGFSRGGM-----GMLTAIEMGQAASFVSW---GGVSDMILT</b> <b>120</b> <b>Ser</b> <b>130</b> <b>140</b> <b>150</b>	<b>510</b> <b>520</b> <b>530</b> <b>540</b> <b>550</b>
<b>yux1.bsupep</b> <b>YTMa</b>	<b>560</b> <b>FTDWQLEHDMMFEDT-----EKLWDRSPLKYAANVETPLILHGERDDRCPIEQAE</b> <b>160</b> <b>YEERQDLRRMMKRVIGGTPKKVPEEYQW-RTPFDQVNKIQAPVILLIHEKDQNVSIQHSY</b> <b>170</b> <b>180</b> <b>190</b> <b>200</b> <b>210</b>	<b>570</b> <b>580</b> <b>590</b> <b>600</b> <b>650</b>
<b>yux1.bsupep</b> <b>YTMa</b>	<b>610</b> <b>QLFIALKKMGKETKLVRFPNASHNLSRTGHPRQRICKRNVISSWFDQHL</b> <b>220</b> <b>LLEEKLKQLHKPVETWYYSTETHYFP----PKENRRIVRQLTQWMKNR</b> <b>230</b> <b>240</b> <b>250</b>	<b>620</b> <b>630</b> <b>640</b> <b>650</b>

**FIG. 3**

FIG. 4

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yux1.bsupep	390	400	410	420	430	440
	TGANDKFVREHTISIPEEIQYATEDGVMVNGWLMRPAQMEEGETTYPLILNIHGGP-HMYY					
YQKD	40	50	60	70	80	90
yux1.bsupep	450	460	470	480	490	500
	GHTYFHEFQVLAAGGYAVVYINPRGSHGYGQEJVNAVRGDDYGGKDYDDVMQAVDEAIKRD					
YQKD	100	110	120	130	140	
yux1.bsupep	510	520	530	540	550	559
	PHIDPKRLGVTVGGSYGGFMTNWIVGQ-----TNRFKAATQRSISNWISFHGVSDIGYFF					
YQKD	150	160	170	180	190	200
	NHRG--LIGIHGESMGAVTALLYAGAHCSDGADFYTADCPFACFDEQLAYRIRAE--YRL					
yux1.bsupep	560	570	580	590	600	610
	TDWQLEH--DMFEDTE---KLWDRSPLKYAANVETPLILHGERDDRCPIEQAEQLFIAL					
YQKD	210	220	230	240	250	260
yux1.bsupep	620	630	640	650		
	KKMGKETKLVREPNASHNLISRTGGHPRQRKRLNYISSWFQHL					
YQKD	270	280	290	300		
	KKRGPKALYIA-ENGEHAMSYTKNRHTYRKTVQEFLDNMNDSTE					
	↑His					

**FIG.-5**

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+  
yux1.bsupep    GTDQGSTGIYYISIEGLVYPIRLEKEYINSEFSLSSPDE-QHFIASVTKPDRPSELYSIPLG  
                  | : |    | : |    | : |    | : |    | : |    | : | : : : |  
                  CAH  
                  380      390      400      410      420      430  
                  QEEKQLTGANDKFVREHTISIP-EEIQAYATEDGVMVNNGWLMRPAQMEEGETTYPLILNIGH  
                  : |    : |    : |    : |    : |    : |    : |    : |    : |  
                  CAH  
                  40        50        60        70        80        90  
                  440      450      460      470      480  
                  GPHMMYGHHTYEHEFQVLAAKGYAV-----VYINPRGSHGYYGQEFGVNAVRGD-  
                  : | : | : | : | : | : | : | : | : | : | : | : |  
                  CAH  
                  100      110      120      130      140  
                  490      500      510      520      530      540  
                  --YGGKDYDDVMQAVDEAIKRDPHIDPKRLGVTTGGSYGGEMTNWIVGOTNRKAAVTQRS  
                  | |    | : | : | : | : | : | : | : | : | : | : | : |  
                  CAH  
                  150      160      170      180↑Ser    190  
                  550      560      570      580      590  
                  -ISNWISFHGV-----DIGYFFTDWQLEHDMFEDTEKLWDRSPLKYAANVETPLLILH  
                  : | : | : | : | : | : | : | : | : | : | : | : | : |  
                  CAH  
                  210      220      230      240      250      260  
                  600      610      620      630      640      650  
                  GERDDRCPIEQAEQLFIAALKM--GKETKLVRFPNASHNLSRGTGHPRQRRIKRLNYISSWF  
                  | |    : | : | : | : | : | : | : | : | : | : |  
                  CAH  
                  270      280      290      300      310  
                  ↑Asp    ↑His  
FIG.\_6

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10

30

ttgattgttagagaaaagaagattccgtcgccaagccagcatgtgcgt  
L I V E K R R F P S P S Q H V R

50

70

90

ttgtatacgatctgctatctgtcaaatggattacgggtaaggggctt  
L Y T I C Y L S N G L R V K G L

110

130

ctggctgagccggcggaaaccgggacaatatgacggattttatattg  
L A E P A E P G Q Y D G F L Y L

150

170

190

cgcggcgggattaaaagcgtgggcatggttcggccggccggattatc  
R G G I K S V G M V R P G R I I

210

230

cagtttgcacccaaagggtttgtgggtttgtccttttacagaggc  
Q F A S Q G F V V F A P F Y R G

250

270

2

aatcaaggaggagaaggcaatgaggattttgccggagaagacagggag  
N Q G G E G N E D F A G E D R E

90

310

330

gatgcattttctgctttcgccctgcttcagcagcacccaaatgtcaag  
D A F S A F R L L Q Q H P N V K

350

370

aaggatagaatccatatcttcggttttcccgccggaaattatggga  
K D R I H I F G F S R G G I M G

390

410

430

atgctcaactgcgatcgaaatggcgcccaggcagcttcatttgttcc  
M L T A I E M G G Q A A S F V S

450

470

tggggaggcgctcagtgatatgattttcacatcggcggcaggat  
W G G V S D M I L T Y E E R Q D

490

510

5

ttgcggcgaatgatgaaaagagtcatcgccggaaacaccgaaaaaggtg  
L R R M M K R V I G G T P K K V

30

550

570

cctgaggaatatcaatggaggacaccgtttgaccaagtaaacaaaatt  
P E E Y Q W R T P F D Q V N K I

**FIG.-7A**

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590 610  
caggctcccggtgctgttaatccatggagaaaaagacccaaatgtttcg  
Q A P V L L I H G E K D Q N V S

630 650 670  
attcagcattcctatatttatttagaagagaagctaaaacaactgcataag  
I Q H S Y L L E E K L K Q L H K

690 710  
ccgggtggaaacatggtaactacagtacattcacacattttccggcca  
P V E T W Y Y S T F T H Y F P P

730 750 7  
aaagaaaaaccggcgtatcgtgcggcagctcacacaatggatgaaaaac  
K E N R R I V R Q L T Q W M K N

70  
cgc  
R

**FIG.\_7B**

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10 30  
gtgatacaaattgagaatcaaaccgttccggattccgtttacat  
V I Q I E N Q T V S G I P F L H

50 70 90  
attgtaaaggaagagaacaggcaccgcgctgttcctctcgatctt  
I V K E E N R H R A V P L V I F

110 130  
atacatggtttacaagcgcaaggaacacaacccatattgcttat  
I H G F T S A K E H N L H I A Y

150 170 190  
ctgcttcggagaagggttttagagccgttctgccggaggcttgcac  
L L A E K G F R A V L P E A L H

210 230  
catgggaacgggagaagaaatggctgttgaagagactggcgccccat  
H G E R G E E M A V E E L A G H

250 270 2  
ttttggatatcgctcaacgagattgaagagatcggtacttaaa  
F W D I V L N E I E E I G V L K

90 310 330  
aaccatttgaaaaagagggcctgatagacggcgccgatcggtctc  
N H F E K E G L I D G G R I G L

350 370  
gcaggcacgtcaatggcgcatcacaacgcttggcgcttgactgca  
A G T S M G G I T T L G A L T A

390 410 430  
tatgattggataaaagccggcgtcagcctgatggaaagcccgaattac  
Y D W I K A G V S L M G S P N Y

450 470  
gtggagctgtttcagcagcagattgaccatattcaatctcagggcatt  
V E L F Q Q I D H I Q S Q G I

490 510 5  
gaaatcgatgtccggaaagagaaggtaacagcagctgatgaaacgtctc  
E I D V P E E K V Q Q L M K R L

30 550 570  
gagttgcggatctcagccttcagccggagaaactgcaacagcgccccg  
E L R D L S L Q P E K L Q Q R P

**FIG.\_8A**

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590 610  
cttttatttggcacggcgcaaaagataaagtgtgccttacgcgccc  
L L F W H G A K D K V V P Y A P

630 650 670  
acccggaaattttatgacacgattaaatcccattacagcgagcagccg  
T R K F Y D T I K S H Y S E Q P

690 710  
gaacgcctgcaatttatcgagatgaaaacgctgaccataaagtcccg  
E R L Q F I G D E N A D H K V P

730 750  
cgggcagctgtttaaaaacgattgaatggttgaaacgtactta  
R A A V L K T I E W F E T Y L

**FIG.\_8B**

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10 30  
ttgaagaaaatcctttggccattggcgcgctcgtaacagctgtcatc  
L K K I L L A I G A L V T A V I

50 70 90  
gcaatcggattgttttgcacatatgattctattcatcaagaaaaaa  
A I G I V F S H M I L F I K K K

110 130  
acggatgaagacattatcaaaaagagagacagacaacggacatgatgtg  
T D E D I I K R E T D N G H D V

150 170 190  
tttgaatcatttgcacaaaatggagaaaaccgctttgtataccctcc  
F E S F E Q M E K T A F V I P S

210 230  
gcttacgggtacgacataaaaggataccatgtcgcacccgcatgacaca  
A Y G Y D I K G Y H V A P H D T

250 270 2  
ccaaataccatcatcatctgccacgggtgacgatgaatgtactgaat  
P N T I I C H G V T M N V L N

90 310 330  
tctcttaagtatgcatttattctagatctcggtggaaatgtgctc  
S L K Y M H L F L D L G W N V L

350 370  
atttatgaccatgcggcatggccaaagcgccggaaagacgaccagc  
I Y D H R R H G Q S G G K T T S

390 410 430  
tacgggtttacgaaaaggatgatctaataagggtgtcagcttgctc  
Y G F Y E K D D L N K V V S L L

450 470  
aaaaacaaaacaaaatcatcgccgattgatcgaaattcatggtgagtcg  
K N K T N H R G L I G I H G E S

490 510 5  
atggggccgtgaccgcctgctttatgctggcgcacactgcagcgat  
M G A V T A L L Y A G A H C S D

30 550 570  
ggcgctgattttatattgccgattgtccgtcgcatgtttgatgaa  
G A D F Y I A D C P F A C F D E

**FIG.\_9A**

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590 610  
cagcttgcctatcggtgagagcgaaatacaggctccgtttggccc  
Q L A Y R L R A E Y R L P S W P

630 650 670  
ctgcttcctatcgccgacttcttttaagctgagggggaggctatcg  
L L P I A D F F L K L R G G Y R

690 710  
gcacgtgaagtatctccgcttgctgtcattgataaaaattgaaaagccg  
A R E V S P L A V I D K I E K P

730 750 7  
gtcctctttattcacagtaaggatgtactacattcctgtttcttca  
V L F I H S K D D D Y I P V S S

70 790 810  
accgagcggctttatgaaaagaaacgcggccgaaagcgctgtacatt  
T E R L Y E K K R G P K A L Y I

830 850  
gccgagaacggtaaacacgcacatgtcatataccaaaaatcgcatc  
A E N G E H A M S Y T K N R H T

870 890 910  
taccgaaaaaacagtgcaggattttagacaacatgaatgattcaaca  
Y R K T V Q E F L D N M N D S T

gaa  
E

**FIG.\_9B**